

home worthy of the first school of geography in the British Empire. At Cambridge also the geographical spirit is active, and new developments may be expected. Extension meetings in the summer spread university teaching far and wide, and everywhere there are signs that teachers who take an interest in their subject are multiplying, and that the conception of geography as a study for mental discipline is spreading. No one in touch with education speaks apologetically nowadays of geography. It has won its place, in comparison with physical science and history, as a science full of problems as well as facts, a mental exercise of no mean order. It is not only to the classical student, but to the man of science, the economist, and the statesman, and Mr. Freshfield added, to the elector, that a just knowledge of geographical conditions may prove serviceable. The abysmal ignorance of the British Empire in large classes of our countrymen who are allowed a share in controlling its destinies is not the least of our national dangers. Dr. H. R. Mill delivered a lecture on the rainfall of the British Isles, and Mr. G. W. Palmer, of Clifton College, gave a lantern exhibition of a set of views of the Dora Baltea.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 12, 1908.—“The Natural Mechanism for evoking the Chemical Secretion of the Stomach.” By J. S. **Eddins** and M. **Tweedy**. Communicated by Prof. E. H. Starling, F.R.S.

By a special method, elsewhere described, the authors were able to restrict the introduction of food material to definite portions of the stomach and intestine. It was therefore possible to test how these different regions behaved as channels for absorption, and what the comparative value of different food substances was in respect of the evoking of the chemical mechanism of secretion of gastric juice. The fundus of the stomach was found to be non-functional in absorption, the pyloric end of considerable value, and absorption in the duodenum also stimulated the fundus to secrete. It was observed that acid alone is but a slight stimulus; dextrin has a marked effect similar to that shown by dextrose and maltose. Commercial peptone and the meat extract devised by Herzen, of Geneva, were found most potent of the substances experimented on.

No evidence was found of any negative hormone passing into the circulation tending to inhibit gastric secretion. The pyloric end of the stomach and the duodenum are to be regarded as the normal channels of such absorption as liberates the gastric hormone. The fundus is definitely excluded.

Royal Microscopical Society, December 16, 1908.—Mr. Conrad Beck, vice-president, in the chair.—(1) A workshop microscope for the examination of opaque objects; (2) a simple method of illuminating opaque objects: J. E. **Stead**.—Mounting rotifers and Protista in Canada balsam: Rev. Eustace **Tozer**.

EDINBURGH.

Royal Society, December 21, 1908.—Prof. Crum Brown in the chair.—A photographic apparatus for automatically recording the readings of the scale and vernier of any instrument: Dr. J. R. **Milne**. The apparatus was a specialised form of camera. When the observer wished to make a reading he pressed a small lever, which set in motion the automatic mechanism. The shutter was first opened and closed, and then the plate was moved on a step so as to bring a fresh part of its surface into position. A 5-inch by 4-inch plate could in this way be covered with seventy small photographs of the scale and vernier, and these could be read off at leisure afterwards. Not only was the work of the observer much lightened, but his eyes were spared much fatigue, while a permanent record was obtained in which there could be no error due to bias or a mistake in reading. The author had used this camera for some time in connection with a polarimeter, and had found it of great advantage in recording the readings of the Nicol.—The friction at the extremities of a short bar subjected to a crushing load, and its

influence upon the apparent compressive strength of the material: G. H. **Gulliver**. As regards the effect of the friction of the crushing plates upon the yield point of short compression specimens, it was found that with plates harder than the material under test the end friction caused an increase in the apparent yield-point stress. This increase was calculated approximately as 20 per cent. for wrought iron and mild steel, 20 per cent. for cast iron, and from 50 per cent. to 200 per cent. for stones, bricks, and concrete. These figures, except the first, might apply almost equally well to the crushing strength, but they required experimental verification. The corresponding inclinations of the surfaces of sliding were -37° for wrought iron and steel, 36° for cast iron, and 27° to 18° for stone, &c. The first value was seldom obtained, but the others agreed fairly well with average experimental results. With the crushing plates of softer material than that under test, the lateral flow of the former diminished the apparent strength of the specimen. For stones crushed between lead plates the calculation indicated a strength from 0.35 to 0.15 of that obtained with iron or steel crushing plates. Experiment gave from 0.65 to 0.45 as the value of the ratio, but the specimens did not rupture by shearing in the manner contemplated in the theoretic discussion. The total crushing load of a short specimen of cast iron was increased by diminishing the length of the piece, but the crushing stress per unit area was simultaneously decreased.

January 4.—Dr. R. H. Traquair, F.R.S., in the chair.—The fossil Osmundaceæ, part iii.: Dr. R. **Kidston** and D. T. **Gwynne-Vaughan**. The paper contained a detailed description of three osmundacean fossils from the Permian of Russia. In the most important, *Thamnopteris Schlechtudalii*, the protostele of the stem has a solid central mass of xylem. The most central tracheæ are short, vesicular and reticulate, and are regarded as being transitional to a parenchymatous pith. On leaving the stele the xylem of the leaf trace is oval in transverse section with a mesarch protoxylem, and on its way through the cortex it gradually changes into the adaxially curved C-shaped trace of the Osmundaceæ. These changes are held to represent the phylogeny of the adaxially curved C-shaped trace in general. The stem stele of the *Zygopteridæ* is held to be phylogenetically connected with that of the Osmundaceæ.—Supplementary report on the hydroids of the Scottish National Antarctic Expedition: James **Ritchie**. Twenty-five species, mostly from the sub-Antarctic and temperate seas, have been added to the list already recorded, bringing the total number of the species and varieties in the *Scotia* hydroid collection up to sixty-one. Several new forms were described, and the known ranges of distribution of many species have been considerably extended.

PARIS.

Academy of Sciences, January 4.—M. Bouchard in the chair.—Certain systems of linear differential equations: Gaston **Darboux**.—The possible danger of turning over in the steering of aeroplanes: L. F. **Bertin**. From an examination of the aeroplanes in current use the author comes to the conclusion that there is a real danger of the whole machine turning over, either by the action of the wind or by the lateral pressure caused by steering out of the straight line. It is pointed out that further experimental data are needed.—Prof. Zirkel was elected a correspondant in the section of mineralogy in place of the late Carl Klein.—The multiform integrals of algebraical differential equations of the first order: Pierre **Boutroux**.—Directed waves in wireless telegraphy: Albert **Turpain**. A reclamation of priority as regards the work of M. Blondel.—Polar magnetic storms and the aurora borealis: Kr. **Birkeland**. Reproductions of eleven photographs are given, in which the phenomena of the aurora are experimentally imitated.—Modifications of the difference of contact potential of two aqueous solutions of electrolytes under the action of a continuous current: M. **Chanoz**. The passage of a continuous current through the contact surface of two aqueous solutions of electrolytes, MR, M'R', is capable of modifying the difference of potential between the two liquids. This variation of potential produced depends, both for intensity and sign, not only on the nature of the solutions, but also on the direction of the passage

of the current through the contact considered.—The influence of the quality of the lighting on the photographic reproduction of colour: J. **Thovort**.—The freezing of mixtures of water and soluble fatty acids: A. **Faucon**. Solutions of formic, acetic, and propionic acids were used. The freezing points of the eutectic mixtures with these three acids were -48° , -27° , and -29.4° respectively, and no formation of any hydrate could be proved.—The density of methane and the atomic weight of carbon: George **Baume** and F. Louis **Perrot**. The gas was prepared by the action of water on methyl-magnesium iodide, and after washing purified by fractional distillation under reduced pressure. Air being appreciably soluble in liquid methane, special precautions were necessary to remove this impurity. The mean weight of the normal litre of methane was found to be 0.7168 gram. According to the method of reduction employed, the atomic weight of carbon from this density is deduced as 12.004 (Leduc), 12.005 (D. Berthelot), and 12.003 (P. A. Guye).—Concerning the atomic weight of silver: A. **Leduc**. A reply to some criticisms of M. Dubreuil.—The silicides of hydrogen: P. **Lebeau**. A large quantity of the gas produced by the action of hydrochloric acid on magnesium silicide was cooled with liquid air, and the compounds of silicon with hydrogen submitted to fractional distillation. Besides pure SiH_4 , not inflammable in air, a gas the density of which (2.18) corresponded with Si_2H_6 was obtained. A third compound, isolated in small quantity, and characterised by its extreme inflammability in contact with air, is probably silico-ethylene, Si_2H_4 . It is this substance which renders the impure silicon hydride spontaneously inflammable.—A case of isodimorphism: H. **Marais**. The forms of ethylamine chlorhydrate and bromhydrate stable at the ordinary temperature are perfectly isomorphous. The forms realisable at higher temperatures are isodimorphous, the stable form of one of the bodies being isomorphous with the unstable form of the other.—The hypotypical regeneration of the chelipeds in *Atya serrata*: Edmond **Bordage**.—Leprosy and demodex: A. **Borrel**.—The parthenogenetic segmentation of the egg in birds: A. **Lécaillon**.—The gastric digestion of casein: Louis **Gaucher**. Coagulation of the milk does not necessarily occur in the stomach, and is not peptonised in that organ.—The effect of bases on the action of certain ferments: C. **Gerber**.—A gravimetric method of constant sensibility for the measurement of high altitudes: Alphonse **Berget**. The apparent variation of the weight of a body, passing from one altitude to another, is proportional to the difference of level of the two stations. This variation is of the order of $1/10,000$ for the height of the Eiffel Tower.—Rain and springs in Limousin in 1908: P. **Garrigou-Lagrange**.—The earthquake of December 28, 1908: Alfred **Angot**. A reproduction of the curve registered by the Milne seismograph at the Parc Saint-Maur Observatory is given.—The earthquake of December 28, 1908: R. **Cirera**. An account of observations made at Ebro.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 14.

ROYAL SOCIETY, at 4.30.—The Yielding of the Earth to Disturbing Forces: Prof. A. F. H. Love, F.R.S.—The Relation of the Earth's Free Precessional Nutation to its Resistance against Tidal Deformation: Prof. J. Larmor, Sec.R.S.—Notes on Observations of Sun and Stars in some British Stone Circles. Fourth Note. The Botallek Circles, St. Just, Cornwall: Sir Norman Lockyer, K.C.B., F.R.S.—On the Depression of the Filament of Maximum Velocity in a Stream flowing through an Open Channel: A. H. Gibson.—On the Passage of Röntgen Rays through Gases and Vapours: J. A. Crowther.—On the Velocity of the Cathode Rays ejected by Substances exposed to the γ -Rays of Radium: R. D. Kleeman.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The G. B. System from a Tramway Manager's Point of View: Stanley Clegg.

MATHEMATICAL SOCIETY, at 5.30.—The Canonical Form of a Linear Substitution: H. Hilton.—On the Solution of the Quintic: J. Hammond.—On Octavic and Sexdecimic Residuarity: Lieut.-Col. A. Cunningham.—On Change of the Variable in a Lebesgue Integral: Dr. E. W. Hobson.—On Abel's Extension of Taylor's Series: Rev. F. H. Jackson.—Note on the Evaluation of a Certain Integral containing Bessel's Functions: Prof. H. M. Macdonald.

FRIDAY, JANUARY 15.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Filtration and Purification of Water for Public Supply: John Don.

MONDAY, JANUARY 18.

ROYAL SOCIETY OF ARTS, at 8.—The Public Supply of Electric Power in the United Kingdom: G. L. Addenbrooke.

VICTORIA INSTITUTE, at 4.30.—Science and the Unseen: Dr. A. T. Schofield.

TUESDAY, JANUARY 19.

ROYAL INSTITUTION, at 3.—Albinism in Man: Prof. Karl Pearson, F.R.S.

ROYAL STATISTICAL SOCIETY, at 5.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Further Discussion: High Speed on Railway-curves: J. W. Spiller.—A Practical Method for the Improvement of Existing Railway-curves: W. H. Shortt.

WEDNESDAY, JANUARY 20.

ENTOMOLOGICAL SOCIETY, at 8.—Annual General Meeting.

ROYAL MICROSCOPICAL SOCIETY, at 8.—Presidential Address, by Lord Avebury: On Seeds, with Special Reference to British Plants.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Annual General Meeting.—Address on Some Aims and Efforts of the Society: Dr. Hugh Robert Mill.

THURSDAY, JANUARY 21.

ROYAL SOCIETY, at 4.30.—Probable Papers: Syntonic Wireless Telegraphy, with Specimens of Large-scale Measurements: Sir O. Lodge, F.R.S., and Dr. Alex. Muirhead, F.R.S.—The Leakage of Helium from Radio-active Minerals: Hon. R. J. Strutt, F.R.S.—The Mobilities of the Ions produced by Röntgen Rays in Gases and Vapours: E. M. Wellisch.—On the Electricity of Rain and its Origin in Thunderstorms: George C. Simpson.—The Photo-electric Fatigue of Zinc, II.: H. Stanley Allen.

LINNEAN SOCIETY, at 8.—The Genus *Nototriche*, Turcz.: Arthur W. Hill.—The Longitudinal Symmetry of Centrospermes: Dr. Percy Groom.

ROYAL INSTITUTION, at 3.—Mysteries of Metals: Prof. J. O. Arnold.

FRIDAY, JANUARY 22.

ROYAL INSTITUTION, at 9.—The World of Life: as Visualised and Interpreted by Darwinism: Alfred Russel Wallace, O.M., F.R.S.

PHYSICAL SOCIETY, at 5.

CONTENTS.

	PAGE
Construction and Use of Cranes. By F. C. L.	301
An Oxford Champion of Darwinism. By F. A. D.	302
Archæology in Greece. By H. R. Hall	303
Sylvester's Mathematical Papers. By G. B. M.	303
A Geography of Russia	304
Locomotive Engineering	305
Our Book Shelf:—	
Bruni: "Feste Lösungen und Isomorphismus."—	
H. M. D.	306
Owen: "The Economic Open-air Chalet for the Hygienic Treatment of Consumption and other Diseases."—R. T. H.	307
Kassowitz: "Welt-Leben-Seele. Ein System der Naturphilosophie in gemeinfasslicher Darstellung."	307
Lorentz: "Abhandlungen über theoretische Physik."—G. H. B.	307
Millard: "The Wonderful House that Jack Has"	307
Letters to the Editor:—	
Sequestrated Church Property.—Francis Galton, F.R.S.	308
The Isothermal Layer of the Atmosphere.—Charles J. P. Cave	308
Magnesium in Water and Rocks.—Prof. Ernest H. L. Schwarz	309
Phosphorescence on a Scottish Loch.—Thos. Jamieson	309
The Movement of Water in Soils. (With Diagram.)—Dr. J. Walter Leather; Dr. E. J. Russell	309
The Correlation of Teaching.—Charlie Woods; Prof. John Perry, F.R.S.	310
An Electromagnetic Problem.—A. Core; D. F. Comstock	310
The Anthropology of the Greenland Eskimo. (Illustrated.)	311
A Human Fossil from the Dordogne Valley. (Illustrated.) By H. O. F.	312
Black-water Fever	313
Animated Photographs in Natural Colours	314
Prof. H. G. Seeley, F.R.S. By R. L.	314
Notes	315
Our Astronomical Column:—	
Further Photographs of Morehouse's Comet	320
Search-ephemeris for Halley's Comet	320
The Distribution of Eruptive Prominences on the Solar Disc	320
Double-star Orbits	320
Errors in Measures of Star Images and Spectra	320
Physical Observations of the National Antarctic Expedition. (Illustrated.)	320
The North of England Education Conference	322
The Æther of Space. By Sir Oliver Lodge, F.R.S.	322
Science and the Practical Problems of the Future. By Prof. E. L. Nichols	325
University and Educational Intelligence	327
Societies and Academies	329
Diary of Societies	330